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## LETTERS TO THE EDITOR.

*\*\* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

*On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.*

*The editor will be glad to publish any queries consonant with the character of the journal.*

## A Suggestion to Rain-Makers.

WHILE these interesting and expensive attempts to produce rain by explosions are being carried out, it should be of special interest to science to ascertain what would be their effect when the general conditions of the atmosphere are favorable for rainfall. The promoters of these experiments show certainly great faith in their theory by selecting the worst imaginable conditions of the arid west for their playing ground; and though faith is an excellent thing, which is said to be even capable of moving mountains, and though Moses, when he was brimful of faith, produced water by striking a rock in the desert, still I am afraid these experiments may have taxed their theory too heavily by venturing to produce rain under the dry conditions generally prevailing in Texas.

Among the absolutely necessary conditions for rainfall is this, that the surface-air should not be dry; and whatever the effect of explosions may be at a higher level, the rain-drops cannot reach the ground by passing through dry surface-air, and it is not conceivable how explosions could suddenly change the dry surface-air into moist or saturated air.

But while these expensive experiments are being gone through, it might be of special interest to ascertain what would be the effect of explosions during a natural rain, or immediately after a natural rain has ceased; and I venture to predict that in the first case the concussion might give a sudden impetus to the downpour, and in the latter case likely produce an after-shower of short duration; and these results would be confirmatory of some experiments whereby I have ascertained that condensation is procurable by compression of saturated air.

A flash of lightning has often been observed to be followed by a sudden increase of downpour in its immediate neighborhood, and although this is likely due to electrical rather than mechanical causes, still I feel confident that a compression-wave passing through saturated air would result in similar effects; and whether this is actually the fact ought therefore to be ascertained while the means of doing so are at hand and while the general interest is awakened on the subject,—if I may venture to make this suggestion.

FRANZ A. VELSCHOW.

Brooklyn, Aug. 31.

## BOOK-REVIEWS.

*A Treatise upon Wire, its Manufacture and Uses.* By J. BUCKNALL SMITH. New York, Wiley. 4°. \$3.

So far as we know, there is no other treatise upon wire which covers so much of the history and uses of the material as the one before us. The manufacture of gold wire dates back at least to 1700 B.C. The present method of drawing wire has been practised certainly in the fourteenth century in some portions of Germany. From these early beginnings our author traces the history of wire and its uses. It was not till 1565 that machine-drawn wire of home make was available in England for the making of hair-pins for Queen Elizabeth; but by 1630 the home industry had grown to such importance as to lead to the total prohibition, by Charles I., of the importation into England of foreign wire.

The uses of wire are, of course, many, and to each our author gives attention in turn. There are the electrical applications, which call for consideration of the tensile strength of the material and its conductivity; there are its uses in netting, gauze, cloth, and cards; there are the pin-making industry and the manufacture of needles; the making of umbrella and spectacle frames, of springs, cycle spokes, nails, and music strings, each of which makes it necessary to produce a wire having properties which shall suit it to the special use. The first chapter treats of iron and steel wire, the latter of which has been brought to a high degree of tensile strength, with the resulting possibility of cable-roads and improved means of transportation on wire-rope railways.

The second chapter is devoted to copper, bronze, brass, platinum, and gold wire. This leads to the consideration of very fine wires and the question of measurement and gauging, to which last subject the third chapter is given up. The fourth chapter, on electrical conductors, closes the first section of the book, which is more especially on the manufacture of wire.

The second section of the book covers the application of wire in ropes, netting, woven fabrics, fencing materials, staples, nails, etc.

The number of illustrations is large and of a character to greatly increase the value of the book.

## AMONG THE PUBLISHERS.

AT the beginning of October an increase of 33½ per cent will be made in the amount of reading-matter printed in the *New York Critic*.

—“An introduction to the Study of Petrology: the Igneous Rocks,” by Frederick H. Hatch, has recently been published by Macmillan. This is a descriptive work of small size. The author does not give any attention to the methods of examining rock sections, etc., but aims to describe the mineral constituents and internal structures of the igneous rocks, their mode of occurrence, and their origin.

—John Wiley & Sons, New York, have issued a third edition of Ludlow's “Elements of Trigonometry.” The author is Lieut. Henry H. Ludlow, U.S.A., who had the co-operation of Edgar W. Bass, professor of mathematics at West Point. The requirements of the United States Military Academy determined the extent and detail of treatment. The book contains both plane and spherical trigonometry, and tables of logarithms of numbers and the trigonometric functions.

—Messrs. Longmans, Green, & Co. brought out not long ago a book by W. Hewitt, science demonstrator for the Liverpool school board, entitled “Elementary Science Lessons,” which aims to carry instruction in science into lower grades of school work than any thing we remember to have seen. The first experiments are made with a sheet of window-glass, a burning candle, and a glass bottle or tumbler, which pieces of apparatus are made to serve many a useful purpose in bringing home physical truths to the infant minds during the course laid out by the author. Yet we often question the wisdom of teaching a child in the class that glass is smooth.

—The American Academy of Political and Social Science has recently published a monograph on “Recent Constitution Making in the United States,” by Francis Newton Thorpe, Professor of Constitutional History in the University of Pennsylvania. The paper is a review of the work accomplished by the Constitutional Conventions of North Dakota, South Dakota, Montana, and Washington. The academy has also recently published a paper on the development of economic science in Italy, by Achille Loria, who is Professor of Political Economy and Statistics in the University of Siena.

—The Rural Publishing Company, New York, has recently brought out “The Nursery Book,” which is a guide to the multiplication and pollination of plants. The author is Professor L. H. Bailey of the Cornell Agricultural Experiment Station at Ithaca, N.Y. A nursery is, by Americans at any rate, understood to mean a place where woody plants only are cultivated; but our author designates by the word an establishment for the propagation of all plants. The book aims to give an account of the methods commonly employed in the propagation and crossing of plants; of the ultimate results and influences of these methods no account is taken. The free use of competent criticism by experienced propagators was resorted to by the author while writing the book, and it is believed that all the methods described have met with approval in this country. More than half the volume is occupied by a “nursery list,” which is descriptive, and covers all the plants ordinarily grown by horticulturists in this country for food or ornament.

—“The Physical Diagnosis of the Diseases of the Heart and Lungs, and Thoracic Aneurism,” by D. M. Cammann, M.D., has recently been published by G. P. Putnam's Sons, New York. This book is the result of notes thrown together for use in teach-

ing. While it is intended as a text-book on the physical diagnosis of diseases of the heart and lungs, the author has confessedly given prominence in this book to some questions which especially interested him. The author's modification of the Cammann stethoscope and the binaural hydrophone are carefully described. The averages of the measurements of the heart by auscultatory percussion are from tables made by the author's father, the late Dr. G. P. Cammann, and have heretofore been published only in part.

— D. Appleton & Co. will publish shortly a revised edition of Professor Joseph Le Conte's "Evolution and Its Relation to Religious Thought." First issued about three years ago, this work has already had four editions, and has proved to be one of the most satisfactory of the many discussions tending to establish the consistency of fundamental religious beliefs with the known laws of development. Three new chapters are incorporated, one of them relating to matters upon which the author states his mind was not fully clear when the book was first written, and he has been "willing to wait and let the heaven work."

— "First Lessons in Arithmetic," of Appletons' Standard Arithmetics, by Andrew J. Rickoff, A.M., LL.D., has just been issued by the American Book Company. In the first steps all the exercises and problems given involve numbers not greater than ten, a modification of the Grube method being employed. Illustrations and diagrams are introduced with a view of making the first steps concrete with every number studied. Part II. deals with units and tens, and here the method, so far as applicable, is the same as that pursued with the digits; and so on. In all parts of the book a proper balance is maintained between too much explanation and too little. A large number and variety of exercises and appropriate problems are provided, and needed explanations and illustrations are given.

— Several new leaflets have just been added to the general series of "Old South Leaflets," issued by the directors of the Old South studies in history, and furnished by D. C. Heath & Co., Boston. All of them are connected with the English Puritan period, and are of value in the study of the development of our own political liberty and of our political system. They include the "Petition of Right," presented by Parliament to King Charles in 1628; the "Grand Remonstrance;" the "Solemn League and Covenant," which gave the name of "Covenanters" to the Scottish Protestants; the "Agreement of the People;" the "Instrument of Government," under which Cromwell began his government; and "Cromwell's First Speech to his Parliament." These "Old South Leaflets," furnishing these famous original documents, heretofore almost inaccessible to the mass of the people, for the few cents covering their cost, are invaluable. There are now nearly thirty in this general series.

— "The Modern Antipyretics: their Action in Health and Disease," by Isaac Ott, M.D., has recently been published by E. D. Vogel, Easton, Pa. The process of fever is more studied of late than ever, and the number of antipyretics has been considerably increased. The maintenance of a constant temperature in the human body is due to the rate of loss of heat being equal to that at which it is generated. The ordinary theory is that in the case of fevers the rate of generation of heat is increased. While this is primarily true, i.e., the fever state is set up by an increase of the rate of heat generation, it is now maintained by a respectable minority that fever is not due to a fire which is kept up by an unduly rapid oxidation of the constituents of the body, but that the increase in temperature is due to a disturbed condition of the means of the dissipation at the surface of the body of the heat generated within. Dr. Ott attacks the too free use of most antipyretics, and recommends the application of such means as will allow the internal heat to escape, as it were.

— Messrs. Macmillan & Co. have commenced the publication of a "Dictionary of Political Economy," which bids fair to be a work of real importance. The first part, containing 128 pages, extends as far as the word "bede," the volume being an octavo with two columns on a page. The editor is Mr. R. H. Inglis Palgrave, and the writers in this first part comprise a large number of the best qualified men in England and Scotland, with several

in America and continental Europe. The articles are intended to cover not only every important topic in economic science, but also many legal and political subjects which it is necessary for economists to know about. Brief biographies of economic writers are given, with some notice even of men like Aquinas, who have treated economics only incidentally. The topic accorded most space in this part is banking; but almost every subject having an economic bearing is dealt with at greater or less length. Judging by this number alone, we should say that the theoretical topics were in danger of being insufficiently treated; but this may be remedied in future numbers. The work is to be completed in twelve or fourteen parts, issued at intervals of about three months, at one dollar each.

— Messrs. S. C. Griggs & Co. announce for early publication "A Study of Greek Philosophy," by Ellen M. Mitchell, with an introduction by W. R. Alger. The author endeavors to explain what is meant by philosophy, discussing the character and source of the Greek philosophy, showing whence came the beginnings of Greek religion and culture. The earlier schools of thought, including the Pythagorean, the Eleatic, the Atomistic, and others leading up to the school of the Sophists, receive critical treatment, short biographical sketches of their principal exponents being given. The chapters on Socrates and the Socratic philosophy are unusually full, the life, character, and fate of the great philosopher being told; and Platonic and Aristotelean philosophies are explained.

— Messrs. William Blackwood & Sons have published a pamphlet by Professor James Seth on "Freedom as Ethical Postulate," which may interest some of our metaphysical readers. The writer by no means agrees with thinkers like Professor Paulsen that the question of free will belongs to the region of metaphysical antiquities: on the contrary, he holds that its solution is necessary to the establishment of a true moral philosophy. He rejects the theory of determinism, and also that of Kant, with its distinction of noumenon and phenomenon, though he agrees with Kant in thinking that our moral consciousness gives us immediate evidence of freedom. The question, then, is how to reconcile this consciousness of freedom and responsibility with the law of causation; but in attempting this task we cannot think that Professor Seth is much more successful than other thinkers who had preceded him. His essay, however, contains some useful hints, and sets forth the present state of the problem very clearly in a small space.

— The *Century Magazine* will celebrate the 400th anniversary of the discovery of America by publishing a "Life of Columbus" written especially for that magazine by Emilio Castelar, the Spanish orator, statesman, and author. The work is written in Spanish, and will be carefully translated. Señor Castelar, whose interest in and admiration for America are well known, has made a careful study of the new historical material bearing upon the subject, and it is said that his papers will be very richly illustrated. Other articles dealing with the discovery of America are in course of preparation for the magazine. In view of the present timeliness of the subject, the same magazine has arranged to print during the coming year an important series of articles on the general subject of agriculture and the Government's relation to the farmer. Among the topics to be treated are "Agricultural Possibilities of the United States," "The Farmer's Discontent," "What the Government is doing for the Farmer," etc. Mr. J. R. Dodge, statistician of the Agricultural Department, Mr. A. W. Harris, of the same department, Professor Brewer of Yale, and others, are among the writers.

— "Optical Projection," by Lewis Wright, was recently published by Longmans, Green, & Co., New York. The author is well known by his excellent treatise on "Light." When a boy Mr. Wright was presented with a projecting lantern of considerable pretensions, a circumstance which resulted in optical projection being a hobby with him for most of the time since. Slides were formerly all that could be used, but as time went on our author found pleasure in projecting on the screen the progress of actual experiments. The beautiful phenomena of polarized light also interested him, and the making of them more spectacularly imposing had due attention. The author was intimately asso-

ciated with one of the leading opticians of London, and having every facility and a great love for the work, has added much to this fascinating method of making lectures attractive. It should be stated that the experiments are most of them physical or chemical.

— Under the auspices of the Boston Society of Natural History, there has been issued a series of "Guides for Science Teaching." No. VIII., entitled "Insecta," is by Alpheus Hyatt and J. M. Arms. This guide is intended to be a series of replies to questions which have arisen in the minds of its authors while teaching. The book is well illustrated, and may prove useful to those for whom it is intended, — teachers and not students. There is something confusing about the arrangement of the book, even repelling, but that conscientious work was put into its compiling no one can doubt. The publishers are Heath & Co., Boston.

— "Telephones: their Construction and Fitting," by F. C. Allsop, just published by E. & F. N. Spon, New York, is a thoroughly practical book. It has to do with wires, magnets, and the various parts of microphones and telephones, so that he that reads may put the parts of a telephone line together properly, and may find the cause of and remedy the various faults which so often occur. The book is especially intended for the use of such persons as wish to go into the construction of private telephone lines.

— The introduction into the high schools of a more careful study of physics, in consequence of the advancing requirements of the college entrance examinations and the increasing importance of this branch of science, has led to the writing of a number of modern text-books, among which those by Dr. Alfred P. Gage are favorably known. The "Physical Laboratory Manual and Note Book" (Boston, Ginn & Co.) aims to give just those details which the pupil should observe, unencumbered so far as possible with matter pertaining only to the construction of the apparatus. The book is not a guide to the construction of apparatus, which subject is treated in "Physical Technics" by the same author.

— F. A. Davis, Philadelphia, has published a second edition of the "Text-book of Hygiene," by George H. Rohé, M.D. Dr. Rohé is connected with the College of Physicians and Surgeons, Baltimore, and is well known among scientific men. Air and water naturally come in for first consideration in this book. Under air is considered not solely the effect of any impurities that may be contained in it, but also what influences, good or bad, are involved in changes of the atmospheric pressure, temperature, and humidity. In this connection the author is able to show the worthlessness of a superstition of surgeons that it is best to perform operations when the barometer is rising. The diagrams showing the variability of the fatality of certain diseases with the season are especially interesting. The moderation of the author throughout is pleasing, and is likely to lead to his book having even greater influence in the future than in the past. After air and water, foods are discussed. The use of alcoholic beverages our author discourages, though he appreciates their use under some circumstances, and is sufficiently scientific to comprehend the facts so far as known. Alcohol is a true respiratory food, not that it contributes nutritive material to the body, but it saves that which is stored up for other uses, by furnishing easily oxidizable material for carrying on the respiratory process and supplying animal heat. Chapters are devoted to the soil, sewerage, and the construction of habitations respectively, at least in the last case so far as any thing about them has an effect on the physical well-being of their inmates. The school-house is next considered, and due attention is paid to the effect on the health of school children of the air they breathe, the light they read by, and the positions they assume at their desks. The soldier's health, that of the prisoner and the factory operative, each have consideration. The maintenance of good health through indulging in due exercise and in cleanly habits, and the use of well ordered clothing, are subjects treated before our author touches on the disposal of the dead and the modern theories of contagion and infection. There are chapters on naval hygiene, by Medical Director Albert L. Gihon, U. S. N., and on quarantine, by Surgeon Walter Wyman, U. S. M.-H. S.

— The closing volume (III.) of the fourth edition of Chambers's "Handbook of Descriptive and Practical Astronomy," which has been issued during the past year or two by the Clarendon Press (New York, Macmillan), is on "The Starry Heavens." It might, perhaps, be said that the whole work is on the starry heavens, but while the other volumes are devoted to the means and methods of astronomical work, this volume describes what can be seen in the heavens, in contradistinction to how to see it. Perhaps the pole-star is that most familiar to most persons, at least the one to which more persons can give a name than to any other; so starting from this the author passes on to tell how the pole-star has not always been the same, and of its possible recognition by the ancient Egyptians. The classification of stars according to magnitude is described, the results of determinations of stellar parallax, and the consequent distances of a few fixed stars, the modes of designating stars, their proper motion, and the distribution of stars in space, are among the subjects treated in the early part of the volume. Several chapters are devoted to multiple and variable stars and to clusters and nebulae, giving in each case some account of their discovery and of the problems to which their existence has given rise. The Milky Way and the constellations are treated in two chapters. The main portion of the book is taken up with the valuable catalogues of stars which make it so useful to all astronomers, and, since their needs have been specially considered, to the many amateur astronomers, possessors of telescopes of low power. Additional objects have been described as types in connection with the chapters on clusters and nebulae. Most important new features are the photometric catalogue of naked-eye stars and the descriptions of ways of finding the constellations during the different months of the year.

— *The Political Science Quarterly* for September is equally strong on the American and the foreign side. Frederic Bancroft of the United States State Department describes "The Final Attempts at Compromise" during the winter of 1860-61. He shows that none of the proposed solutions of the slavery question could possibly satisfy even the more moderate representatives of both sections, and that none of the proposed compromises could have settled the question between the free and the slave States. Thomas L. Greene discusses "Railroad Stock-Watering" and railroad rates. He maintains that high dividends are not usually associated with high rates, and that the increase of the capital stock of a railroad is no sufficient ground for governmental interference to reduce rates. He distinguishes between innocent stock-watering, which seeks to bring railroad capitalization into accord with the laws of finance, and that which is not innocent. The latter, he thinks, can best be checked by enforced publicity, as is done in New York. Professor F. J. Goodnow of Columbia College traces the development of "The Writ of Certiorari" in England and the United States. He shows how the province of the writ has been modified and its application extended until it has become the chief means of protecting private rights against the arbitrary action of administrative authorities, the ordinary courts assuming that control over the administration which on the continent of Europe is vested in special tribunals. Three articles deal with foreign questions. Professor Richard Hudson of the University of Michigan takes "The Formation of the North German Confederation" as the text for an acute and suggestive criticism of all the legal theories regarding the federal state. He demonstrates that the formation of such a state is not susceptible of juristic explanation. Professor Ugo Rabbeno of Bologna, one of the best of Italy's younger economists, gives an extended *résumé* of "The Present Condition of Political Economy in Italy." This article contains a mass of information not elsewhere accessible, and will therefore be invaluable to all students of economic science. Finally Professor W. J. Ashley of Toronto University, Canada, subjects Gen. Booth's scheme for the social regeneration of England through Salvation Army "colonies" to a destructive scientific criticism. The "Reviews" and "Book Notes" contain about forty titles.

— John R. Spears, the author of a recent article on the devastating sand-waves at Capes Henlopen and Hatteras, has made a reputation as a traveller in out-of-the-way places. An article by Mr. Spears on "Odd American Homes" in the September number of

*Scribner's Magazine* is the result of extended observation, especially in the West and South-west, where Mr. Spears made a journey at the time of the Oklahoma boomer excitement. It is illustrated from photographs made by the author of some very unique frontier dwellings. There has been a great deal of discussion during late years in regard to shortening college courses, and higher university work. Professor Josiah Royce of Harvard, in an article in the same number on "Present Ideals of American University Life," makes a plea for the raising rather than lowering of the university standard, and sets forth the past and present college methods, showing the lines on which he thinks the great American university of the future should work. In the same issue of the magazine Mr. James Ricalton, writing of the wonderful old ruins of monuments and shrines at Anuradhapura, the City of the Sacred Bo-Tree in Ceylon, says: "From the days of the mound builders down to the Eiffel tower, man has shown himself to be a monument-erecting being; the Christians have their cathedrals, the Mohammedans have their mosques, and the Buddhists have their shrine-tombs, designated differently in different countries as pagoda, tope, and dagoba. The pagodas of China are entirely dissimilar to those of Burmah, and the dagobas of Ceylon are quite unlike those in either country; yet all serve the one purpose of relic sepulture. They are not altogether a thing of the past; they are still erected near the temples; but those of modern construction are small and unimportant when compared with those that

have withstood biennial monsoons for two thousand years; even their half-buried ruins are stupendous."

—It will be remembered that the edition of "Catalogue of Minerals and Synonyms," by Thomas Egleston, Ph.D., which was originally published by the government, was soon exhausted, and that a new edition was promised by John Wiley & Sons, New York, some months since if sufficient subscriptions should be received to justify the expense. This new edition is now received. This catalogue was commenced in 1867 for use in arranging the collections of the School of Mines of Columbia College, but the press of other duties caused such delays that practically a new catalogue was begun and finished twenty years later; and it is this that is given to the public. The need of a collection of synonyms has been shown by the quick way in which the government edition was seized upon, and we doubt not the New York publishers will be duly rewarded for bringing out this new edition (\$2.50).

—In Stewart's "Plane and Solid Geometry," just published by the American Book Company, there are several features worthy of notice. One prominent feature is the close adherence to the principle of association, each book treating of only one subject, and each section of one subdivision of the subject. Another good feature is the system of so grading the exercises and presenting them in such order that their successive solution should tend to

Publications received at Editor's Office,  
Aug. 5-Sept. 1.

- ANDERSON, E. L. The Universality of Man's Appearance, and Primitive Man. Edinburgh, Douglas (Cincinnati, Clarke). 28 p. 8°. 25 cents.  
DOWIE, M. M. A Girl in the Karpathians. New York, Cassell. 301 p. 12°. \$1.50.  
EGLESTON, T. Catalogue of Minerals and Synonyms. New York, Wiley. 378 p. 4°. \$2.50.  
LANGLEY, S. P. Experiments in Aerodynamics. Washington, Smithsonian Inst. 115 p. f°. 10 cents.  
RICKOFF, A. J. First Lessons in Arithmetic. New York, American Book Co. 150 p. 12°. 36 cents.  
SETH, James. Freedom as Ethical Postulate. Edinburgh, Blackwood. 48 p. 8°. 10 cents.  
SMITH, J. Bucknall. A Treatise upon Wire, Its Manufacture and Uses. New York, Wiley. 347 p. 4°. \$3.  
STEWART, S. T. Plane and Solid Geometry. New York, American Book Co. 406 p. 12°. \$1.12.  
WINSLOW, I. O. The Principles of Agriculture for Common Schools. New York, American Book Co. 152 p. 12°. 60 cents.

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The Terrace at Persepolis. By Morton W. Easton, Ph.D., Professor of Comparative Philology.  
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A Monograph on the Tempest. By Horace Howard Furness, Ph.D., LL.D.

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cause a constant growth in the power of thought, analytic and synthetic. It may be noted also that a definite plan is followed with respect to diagrams: lines mentioned in the statement, for instance, are solid, unless planes intervene; while all additional lines, mentioned in the construction, are dotted, the more important lines being heavier than those of lesser importance. Moreover, the diagrams and their demonstrations, throughout the volume, are invariably so placed that they may both be seen without turning a leaf — either on the same or on facing pages.

— A third edition has recently appeared of Frazer's "Tables for the Determination of Minerals." This book is based, as is well known to many *Science* readers, on one by Weisbach, which was first published in 1866. The purpose is to aid the student in determining minerals by their physical properties as distinguished from the chemical reactions which they give. That it is possible so to arrange tables that it shall be in the main possible, by their use, for the student to determine a mineral from its color, lustre,

streak, hardness, crystalline form, and cleavage, has been shown by the reception which this book has had through its various editions. Many know how much that was antiquated in chemical science has clung to the text books of mineralogy, and it was one of Dr. Frazer's aims in the production of this new edition of his "Tables" to eliminate all of this old and substitute formulas, etc., more in accordance with the present state of chemical science. The book is well known, so it seems unnecessary to commend it to our readers more than by saying that this edition is to a great extent quite new (Philadelphia, Lippincott).

— The American Book Company has published "The Principles of Agriculture for Common Schools," by J. O. Winslow. This is quite a departure from the usual run of school books, and will interest many who wish to see the elements of science taught in the schools. The book is not limited to what would usually be called agricultural science, but contains snatches from all branches of science which have a bearing on agriculture.

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